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EXAMINER	
MURALIDAR, RICHARD V	

ART UNIT	PAPER NUMBER
2838	

DATE MAILED: 08/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/780,145	MYERS, KEITH	
	Examiner	Art Unit	
	Richard V. Muralidar	2838	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 May 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

FINAL ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4, 6, 9, 11-14, 16, and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pollock [US 6384564].

With respect to Claims 1 and 11, Pollock discloses a capacitor discharge system [Fig.13], comprising: a first capacitive circuit comprising a first capacitor [Fig. 13 capacitor 35] and a first switch [Fig. 13, transistor 32] connected in series between a common node [the lower negative rail shown in Fig. 13 is a common node] and an inductor [Fig.13 inductor 30; alternatively, inductor 23 is the first inductor and inductor 22 is the second inductor]; a second capacitive circuit comprising a second capacitor [Fig. 13 capacitor 36] and a second switch [Fig. 13, transistor 31] connected in series between the static common node and the inductor; and a charging device [Fig. 13 the power supply for the upper positive and lower negative rail]; wherein said charging device places a timed [timing is implicit since the capacitor will only charge for a set time that is determined by the resonant factors of the circuit, as well as the timing of the transistors 31 and 32] first electric charge on said first capacitor during a first charging cycle, said first switch [Fig. 13, transistor 32] creates a first electrical path from said first

capacitor to said second capacitor through said first inductor [the path is from capacitor 35, through inductor 30, through transistor 32, and through the lower negative rail which connects to second capacitor 36] during a first discharge cycle, said charging device places a timed [timing is implicit since the capacitor will only charge for a set time that is determined by the resonant factors of the circuit, as well as the timing of the transistors 31 and 32] second electric charge on said second capacitor during a second charging cycle, and said second switch [Fig. 13, transistor 31] creates a second electrical path [the path is from the upper positive rail which connects to first capacitor 35, through transistor 31, through inductor 30, and to second capacitor 36] from said second capacitor to said first capacitor through said second inductor during a second discharge cycle [col. 2 lines 66-67 and col. 3 lines 1-15]. Pollock does not disclose that the common node represented by the lower negative rail is a static common node [i.e. an earth ground].

At the time of the invention, it would have been obvious to one of ordinary skill in the art to ground the lower negative rail, effectively making it a static common ground, for the benefit of enhancing user safety. *Grounding the lower negative rail represents a well-known and common safety practice* in industry, as well as being a standard electrical engineering principle.

With respect to Claims 2 and 12 [original], Pollock discloses a motor shaft that interacts with a magnetic field generated by a flow of electric current through said first inductor during said first discharge cycle and said second inductor during said second discharge cycle to produce a rotating motion of said motor shaft [Abstract; Fig. 13; col. 1

lines 27-38].

With respect to Claims 3 and 13 [original], Pollock discloses that said first inductor and said second inductor are electric motor phase windings [Fig. 13 field windings 22 and 23].

With respect to Claims 4, Pollock discloses a capacitor drain circuit [the combination of the first capacitive and second capacitive circuits in claim 1] connected to a first node [Fig. 13, the first node is the node shown between capacitors 35 and 36] between the first capacitor and the first switch and also connected to a second node [Fig. 13, the second node is the node shown to the right of inductor 30] between the second capacitor and the second switch, wherein said capacitor drain circuit is adapted to remove a first residual electric charge from said second capacitor during said first charging cycle and for removing a second residual charge from said first capacitor during said second charging cycle [col. 4 lines 56-67 and col. 5 lines 1-7; the circuit is at resonance and is therefore cyclically adding residual charge between the capacitors and the inductors once every half cycle then removing the charge during the other half cycle].

With respect to Claim 6 [original], Pollock discloses a shaft position sensor; a switch control circuit; and magnetic material mounted on said motor shaft; whereby said shaft position sensor detects movement of said magnetic material corresponding to said rotating motion of said motor shaft, said shaft position sensor transmits a signal to said switch control circuit, and said switch control circuit controls said charging device and said capacitor drain circuit [col. 1 lines 27-38]. Another example of rotor shaft sensing

can be found in Harris US 5075610 [Fig. 1; col. 1 lines 25-29].

With respect to Claim 9 [amended], Pollock discloses said first and second switches comprise solid state switching devices [Fig. 9 transistors 31-32].

With respect to Claims 14 [amended], Pollock discloses a capacitor drain circuit for removing a first residual electric charge relative to said static common node from said second capacitor during said first charging cycle and for removing a second residual charge relative to said static common node [refer to claim 1 for obviousness statement regarding static common node] from said first capacitor during said second charging cycle [col. 4 lines 56-67 and col. 5 lines 1-7; the circuit is at resonance and is therefore cyclically adding residual charge between the capacitors and the inductors once every half cycle then removing the charge during the other half cycle].

With respect to Claim 16 [original], Pollock discloses said discharge switching device is a solid-state switching device [Fig. 9 transistors 31-32].

With respect to Claim 22 [amended], Pollock discloses a method of creating an alternating magnetic field in a motor [col. 4 lines 26-31] comprising the steps of: placing a first electric charge relative to a static common node [refer to claim 1 for obviousness statement concerning static common node] on a first capacitor [Fig. 13 Capacitor 35]; creating a first electrical path between said first capacitor and a second capacitor [Fig. 13 Capacitor 36] through a first inductor [Fig. 13 inductor 23]; placing a second electric charge relative to a static common node [refer to claim 1 for obviousness statement concerning static common node] on said second capacitor; and creating a second electrical path between said second capacitor and said first capacitor through a second

inductor [Fig. 13 inductor 22].

With respect to Claim 23 [amended], Pollock discloses removing a first residual charge relative to a static common node [refer to claim 1 for obviousness statement concerning static common node] from said second capacitor during said step of placing a first electric charge on said first capacitor; and removing a second residual charge relative to a static common node [refer to claim 1 for obviousness statement concerning static common node] from said first capacitor during said step of placing a second electric charge on said second capacitor [this is an explanation of resonance theory and is explained in col. 2 lines 66-67 and col. 3 lines 1-15].

Claims 20-21 are rejected under 35 U.S.C. 103[a] as being obvious over Peng [US 6111770].

With respect to Claim 20 [amended], Peng discloses a method of creating an alternating magnetic field in an inductor [Fig. 4d inductor Lr] comprising the steps of: placing a first electric charge on a first capacitor [Fig. 4d capacitor Cr2] relative to a common node [the lower negative rail shown in Fig. 13 is a common node]; creating a first electrical path between said first capacitor and a second capacitor [Fig. 4d capacitor Ct1] through an inductor; placing a second electric charge on said second capacitor relative to a common node [the lower negative rail shown in Fig. 13 is a common node]; and creating a second electrical path between said second capacitor and said first capacitor through said inductor [this is an explanation of resonance theory and is described in col. 2 lines 34-46]. Peng does not disclose that the common node

represented by the lower negative rail is a static common node [i.e. an earth ground].

At the time of the invention, it would have been obvious to one of ordinary skill in the art to ground the lower negative rail, effectively making it a static common ground, for the benefit of enhancing user safety. *Grounding the lower negative rail represents a well-known and common safety practice* in industry, as well as being a standard electrical engineering principle.

With respect to Claim 21 [amended], Peng discloses removing a first residual charge relative to a static common node [refer to claim 20 for obviousness statement concerning static common node] from said second capacitor during said step of placing a first electric charge on said first capacitor; and removing a second residual charge relative to a static common node [refer to claim 20 for obviousness statement concerning static common node] from said first capacitor during said step of placing a second electric charge on said second capacitor [this is an explanation of resonance theory and is described in Col. 1 lines 26-29].

Claims 5 and 15 are rejected under 35 U.S.C. 103[a] as being unpatentable over Pollock [US 6384564 in view of Harris [US 5075610].

With respect to Claims 5 and 15 [original], Harris discloses a shaft position sensor [Fig. 1 rotor position sensor 76]; a switch control circuit [Fig. 1 controller 74]; and magnetic material mounted on said motor shaft [col. 9 lines 32-37]; whereby said shaft position sensor detects movement of said magnetic material corresponding to said rotating motion of said motor shaft, said shaft position sensor transmits a signal to said

switch control circuit, and said switch control circuit directs the activity of said charging device and said capacitor drain circuit [col. 7 lines 66-69 and col. 8 lines 1-64]. Pollock mentions the shaft position sensor etc. in [col. 1 lines 27-38], but only in passing. Harris elaborates on each item.

Pollock and Harris are analogous methods of controlling electrical motors. At the time of the invention, it would have been obvious to one of ordinary skill in the art to explicitly add the shaft position sensor with switch control circuit to Pollock for the benefit of further elucidating the principle of operation of the switched reluctance motor (SRM); specifically, how each winding is alternately energized and de-energized with respect to rotor shaft position in order to produce shaft rotation. Additionally, incorporating Harris introduces benefits such as backwards compatibility with older SRM's already geared for mechanical sensing and switches.

Claims 7-8 are rejected under 35 U.S.C. 103[a] as being unpatentable over Pollock [US 6384564] in view of White [US 2561897].

With respect to Claim 7 [amended], Pollock discloses the capacitor discharge system of claim 2, but does not disclose that the first and second switches comprise mechanical switches. White discloses a capacitor discharge system wherein said discharge switching device is a mechanical switch [Fig. 1 rotary switch 4].

Pollock and White are analogous methods of reversing current flow in a circuit through the use of switches.

At the time of the invention it would have been obvious to one of ordinary skill in

the art to utilize mechanical switches with Pollock, as taught by White, for the benefit of backwards compatibility with older switched reluctance motors [SRM's] that are already set up for mechanical switch operation.

With respect to Claim 8 [original], White discloses said motor shaft includes a motor shaft gear, said mechanical switch includes a switch gear, and said switch gear is driven by said motor shaft gear during said rotating motion of said motor shaft to produce a rotating motion of said mechanical switch [col. 2 lines 41-43. Pollock does not teach a mechanical switch or means to actuate one. However, examiner notes that *this is an obsolete means of determining rotor position* in today's switched reluctance motors. Current means in this field involves sensor-less methods that determine the current flow in the field windings, which then uses this information to extrapolate the rotor's exact position [Harris US 5075610 col. 1 lines 54-63]. However, if one desires a mechanical means of determining rotor position, one of ordinary skill in the art can very easily set up the appropriate configuration of gears and rotating contacts on the motor shaft to accomplish this].

At the time of the invention, it would have been obvious to one skilled in the art to modify Pollock with a mechanical means of sensing rotor position for the benefit of backwards compatibility with older SRM's that use mechanical rotor sensors.

Claims 10 and 19 are rejected under 35 U.S.C. 103[a] as being unpatentable over Pollock [US 6384564 in view of Ehsani [US 5852358].

With respect to Claim 10 [amended], Pollock discloses the capacitive discharge

system of claim 9, but does not disclose solid-state switches that are silicon-controlled rectifiers.

Ehsani discloses each of said solid-state switching devices includes a silicon-controlled rectifier [Fig. 3 Switches 102, 104, 106, 108, 110, 112].

With respect to Claim 19 [original], Pollock discloses the capacitor discharge system of claim 10, as well as solid state switches, but does not disclose said solid state switches are SCR's controlled by the switch control circuit.

Ehsani discloses said plurality of silicon-controlled rectifiers is controlled by said switch-control circuit [Fig. 1 trigger signal generator 42; col. 2 lines 23-27].

Pollock and Ehsani are analogous motor control circuits. At the time of the invention, it would have been obvious to one of ordinary skill in the art to specify SCR's as the controlled solid state switches for the benefit of utilizing the most widely used low cost solid-state switches in use today.

Claims 17-18 are rejected under 35 U.S.C. 103[a] as being unpatentable over Pollock [US 6384564 in view of Harris [US 5075610] in further view of Ehsani [US 5852358].

With respect to Claim 17 [original], Ehsani discloses said solid-state switching device comprises a plurality of silicon-controlled rectifiers [Fig. 3 Switches 102, 104, 106, 108, 110, 112]. Pollock and Harris disclose solid-state switches, but not specifically silicon-controlled rectifiers.

With respect to Claim 18, Ehsani discloses said plurality of silicon-controlled

rectifiers is controlled by said switch-control circuit [Fig. 1 trigger signal generator 42; col. 2 lines 23-27]. Pollock and Harris do not disclose that SCR's are controlled by the switch-control circuit.

Pollock, Harris, and Ehsani are analogous motor control circuits. At the time of the invention, it would have been obvious to one of ordinary skill in the art to add SCR's to the motor controller as the solid-state switches for the benefit of utilizing the most widely used low cost solid-state switches in use today.

Response to Arguments

Applicant's arguments filed 5/12/2006 have been fully considered but they are not persuasive.

Applicant's arguments on pages 12 and 13 of the remarks all concern the static common node of the invention being an earth ground, as opposed to a floating ground. The examiner does not find any patentable distinction between the static common node ground claimed by the applicant, and the floating grounds as shown by Pollock [US 6384564]. The reason for this is because common rails are often grounded in electrical/electronic circuitry for safety reasons, and is an obvious modification in view of industry standards for grounding safety. There is no evidence to indicate that Pollock's circuit would operate improperly if the common rail were to be earth grounded. This amendment has been addressed in independent claim 1 above.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Pelonis [US-6664750], Makaran [2001/0000293], and Limpaecher [5986907] are cited for the disclosure of various regenerative means of controlling motors and reusing excess energy.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard V. Muralidar whose telephone number is 571-272-8933. The examiner can normally be reached on 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Karl D. Easthom can be reached on 571-272-1989. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RVM
8/14/2006

KARL EASTHOM
SUPERVISORY PATENT EXAMINER